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*The Planting and Care
of Shrubs and Trees*

DONALD J. BUSHEY

Cornell Extension Bulletin

CONTENTS

Nursery-grown plants	3
Native plants	4
Deciduous shrubs	4
Vines	5
Trees	5
Evergreens	7
Season to transplant	7
Hardy trees, shrubs, and vines	7
Garden roses	8
Evergreens	8
Summer planting	8
Soil preparation	8
Deciduous trees, shrubs, vines, and all alkaline-soil plants	8
Acid-soil plants	9
Planting	10
Setting the plant	10
Bare-rooted plants	10
Plants with ball of earth	10
Watering	11
Mulching	11
Pruning newly set plants	11
Shrubs	11
Vines	12
Deciduous trees	12
Evergreens	12
Maintenance	13
Cultivation	13
Shrub borders	13
Specimen plants	13
Mulches	13
Watering	13
Fertilizers	14
Shrubs	14
Trees	14
Acid-soil plants	15
Pruning	15
Shrubs	15
Desirable flowers	15
Desirable fruit	16
Showy stem coloration	17
Form of plant	17
Method of pruning	18
Vines	22
Deciduous trees	23
Narrow-leaved evergreens	24
Hedges	24
Windbreaks	24
Plant list	25
Garden roses	30
Location	30
Planting	30
Winter protection	30
Pruning	32
Bush or bedding types	32
Climbing roses	32

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THE PLANTING AND CARE OF SHRUBS AND TREES

By DONALD J. BUSHEY

THE CONTINUED and greater interest in rural landscape planting of public and private grounds is evident from the amount of work that is being done in the State. New information resulting from recent experiments in the planting and care of shrubs and trees necessitates a few changes in practices from time to time. The material contained in this edition is much the same as that of the last edition including the list of woody plant materials. The plants have been divided into size groups for the convenience of those who are doing their own plantings.

NURSERY-GROWN PLANTS

ALL TREES, shrubs, and evergreens grown in nurseries, if they have been properly cared for, will have been transplanted or root-pruned at least two or three times before they are ready for market. In the process of root-pruning and transplanting, the long roots are cut off, which stimulates a growth of fibrous, or feeding, roots in a mass directly underneath the plant. This growth of feeding roots makes digging, packing, transporting, and planting much easier, and the plants become established quicker when they are set out than do collected plants. Also it is true that nursery plants will be better shaped than native trees and shrubs from fields or woods. The tops have been pruned for a desirable head, while many of the native plants will require careful pruning to obtain a well-formed plant. Usually this training must be done gradually from year to year, cutting out the ill-shaped and unnecessary wood and encouraging the branches that will ultimately fill in the open spaces and form a strong structural framework.

The failure of a newly set plant to grow results from lack of care in planting if the roots have not been seriously broken or allowed to dry out before planting. Care must be taken to use good soil and to firm it completely around all of the roots. Other causes of failure include insufficient watering, particularly during the first growing season, insufficient top pruning, or failure to mulch. For the most part, a mulch is a protective covering that is placed on the surface of the ground and around the base of the plants.

Plants that cannot be set as soon as they are received from the nursery should be heeled in the ground by digging a trench, placing the roots in the bottom, and covering them with soil (figure 1). If the roots are dry,



FIGURE 1. HEELING IN

they should be immersed in water for an hour or two before they are heeled in. The soil that has been firmed around the roots should be kept moist until it is frozen, or until the plants can be set in their permanent positions.

NATIVE PLANTS

IN MOST parts of New York State certain varieties of native shrubs and trees grow in abundance. Usually, there is no harm in transplanting some of these to form a part of the home landscape. However, each person contemplating such planting should keep in mind the natural beauty of these plants, and should refrain from taking those kinds that grow infrequently in the neighborhood.

When a plant is moved, the roots are disturbed and many of them are broken. The broken roots should be cut off with a sharp knife or pruning shears. The disturbance and decrease of actual absorbing surface of the root system must be balanced by cutting back the top (decreasing the foliage surface) of deciduous plants. Deciduous plants are those that drop their leaves in winter. Evergreens are moved with a ball of earth on the roots which is wrapped in burlap.

Deciduous shrubs

Shrubs to be transplanted from a natural stand or from one part of a home ground to another are taken most safely with a ball of earth on the roots. This is simple enough for plants growing in a clay or clay loam soil. The size of the ball will vary with the size of the plant. The average shrub should be transplanted with a ball of earth about one-half the spread of the branches. Shrubs growing in a sandy or gravelly soil are more difficult to move with a ball of earth than are those grown in clay

or clay loam because the soil will fall away from the roots as the plant is dug. However, plants growing in light soils can be more easily dug with a large root system. A pick is used to comb the roots, thus saving a large proportion of the root system. A shovel may also be useful to remove loose soil, but care must be taken not to cut or damage the roots. If this work is done during a cloudy day, or during a rain, the roots will not dry out while the plant is being moved. If the shrubs must be moved on a sunny day, the soil should be puddled around the roots so the small roots will be covered with this mud. This precaution should be supplemented by covering the roots with wet burlap to protect them from the sun and wind. Any plant should be set in the new location as soon as possible.

Vines

The same process of transplanting as that described for shrubs, applies to vines, except that it is more difficult to determine what size the ball of earth should be. Obviously, a large vine requires a larger root system than does a small vine. A small vine may require a ball only from 12 to 18 inches in diameter, while a large one may need a 2- or 3-foot ball of earth. Reasonable judgment should be the best guide. Vines growing in a sandy or gravelly soil should be dug as described for shrubs.

Trees

There are distinct advantages in moving small trees instead of large ones. The labor involved is important. Large trees require much more time and effort than do small ones. Also, a small tree recovers from transplanting more quickly and grows more rapidly than does a large one of the same variety if the soil and moisture are the same. The small tree will frequently catch up with the large tree in size in from 10 to 20 years. The only advantage in moving a large tree is the immediate effect obtained. Some persons value this above the more rapid growth of the smaller tree.

A small tree (3 inches or less in diameter) can be moved in the same way as shrubs are moved except for the size of the ball of earth. A general rule to follow to determine the size of the ball to take with a tree is to make the ball of earth 1 foot in diameter for each inch of tree-trunk diameter. This applies to both large and small trees. The diameter of the tree is taken about 1 foot above the surface of the ground.

When a large tree is to be moved from its natural situation, it should be root pruned at least one growing season before it is moved. This is done during the dormant season by digging a trench, about 5 feet in diameter for a 6-inch tree and deep enough to sever all of the roots extending into

the trench (figure 2, *A*). Usually a trench 2 feet deep will be enough. The trench should be filled with good fertile soil or soil mixed (about $\frac{1}{4}$ its volume) with peat moss. The top of the tree should be trimmed back about one-fourth. This top pruning should be on the side branches as indicated in figure 2, *F*. Usually, one growing season is enough time for new root growth. In the fall or the following spring, the tree may be moved with a reasonable assurance of success by digging a trench just outside the trench previously dug, loosening the roots with an iron bar

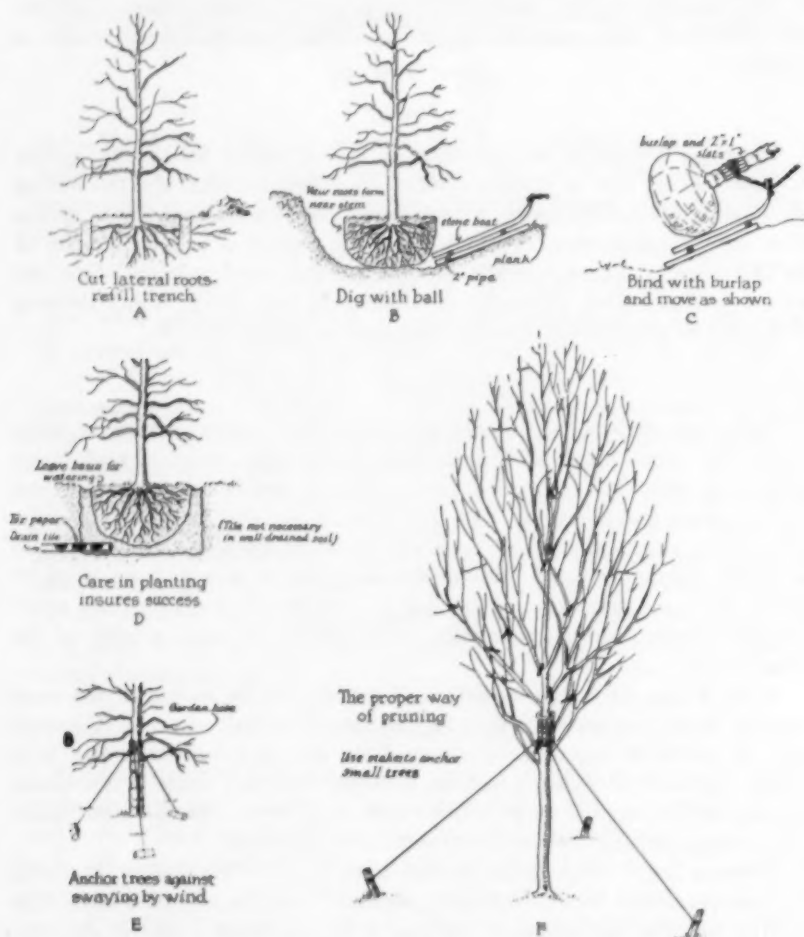


FIGURE 2. METHOD OF TRANSPLANTING, PRUNING, AND BRACING A TREE

or a pick, being careful not to damage the new roots, and thus decreasing the size of the ball to about 4 feet in diameter. The exposed roots must be protected with wet burlap unless a rainy day is chosen for the work. Decreasing the size of the ball lightens the weight and makes transportation easier. To move a very large tree, 8 inches or more in diameter, special equipment is needed, and trained men should do the work. A tree up to 6 inches in diameter, and with a ball of earth, may be transported on a stone boat (figure 2, *B* and *C*).

The method of preparing trees for transplanting is a long one, but professional tree men move large trees successfully without this year-long preparation. They dig a tree with an ample ball of earth and transplant it immediately and at any time of year.

Evergreens

Evergreens that are large enough to be used for landscape planting should be dug, moved, and planted with a ball of earth on the roots. This ball of earth usually is wrapped in burlap or similar material and tied tightly with heavy string. The process of digging them is the same as that described for trees and as illustrated in figure 2. The size of the ball of earth is approximately the same as that taken with shrubs for the shrub forms of evergreens and as that taken with trees for the tree forms. Columnar or pyramidal forms of evergreens may require a ball of earth as wide or wider than the spread of the branches.

SEASON TO TRANSPLANT

Hardy trees, shrubs, and vines

The following recommendations are based on what little experimental evidence is available on the best season to transplant woody ornamental plants.

Most hardy trees, shrubs, and vines, if they have been freshly dug and planted within an hour or two, will survive equally well whether planted in the spring or the fall, provided the roots have not been exposed to drying sun and winds. Spring planting is probably somewhat safer than fall planting. It has been fairly well established that root growth will not start when the soil temperature is below 40° to 45° F. At Ithaca, New York, the soil temperature at the 12- to 18-inch depth is below 40° to 45° F. from about October 15 to May 1. This includes all of the fall-planting season, from the time the leaves begin to turn color to the time the ground is frozen. It also includes most of the spring-planting season, from the time the frost is out of the ground and the soil is dry enough to be workable to the time growth starts.

Garden roses

Garden roses may be planted successfully in the spring or the fall. In severe climates, spring planting is preferable.

Evergreens

Broad-leaved evergreens, such as laurel and rhododendron, are successfully planted either in the fall or the spring, but early spring probably is the safer time.

Narrow-leaved evergreens, such as pine, spruce, juniper, yew, and the like, are best planted early in the spring. Early fall planting usually is successful also. Fall planting usually begins about August 15, depending upon the season, and lasts for four or five weeks. The spring planting season begins as soon as the frost is out of the ground and continues until the growth starts.

Summer planting

Some nurseries are now selling and planting evergreen shrubs throughout the summer and guaranteeing the plants. This is done by storing the plants with a ball of earth which is wrapped with burlap and packed in wet peat moss or in loose ground kept moist. The plants thus remain in a good growing condition until they are planted. Transportation and planting does not disturb the root system to a marked degree, and with a little extra care in watering, the plants do well.

The same is being done with flowering shrubs, perennials, and garden roses. Large trees are being moved with success in midsummer when the trees are in full leaf. Although this practice is comparatively new, several nurseries have carried on the operation with success. The main consideration in the survival of these plants seems to be in giving them enough moisture.

SOIL PREPARATION

Deciduous trees, shrubs, vines, and all alkaline-soil plants

MANY times the soil obtained from the excavation for the house has been put on the surface of the ground surrounding the house. This subsoil needs to be improved before it is suitable for plants. These soils usually are deficient in organic matter (decomposed vegetable materials), but can be improved by adding well-rotted barnyard manure or peat moss. On a farm the manure is available in quantity, and in the city one can get peat moss. Of the two materials, peat moss is the better. It retains a larger amount of moisture than does manure, and is free of weed seeds. However, either of these materials can be used to advantage by adding about

one-fourth, by volume, to three-fourths of soil. In a shrubby bed, a 2- to 3-inch layer can be spread over the area and forked into the top 8 to 12 inches of soil. To prepare the soil for a specimen plant, such as a shade tree, a single hole is dug large enough to hold the plant, and the soil thus obtained is mixed with one-fourth that amount of wet peat moss. Wet peat moss mixes much better with the soil than does dry moss, and the results in plant growth will be better.

Acid-soil plants

Acid-soil plants, such as rhododendrons, blueberries, mountain andromeda, laurel, and the like, require special soil conditions; a moist soil that is acid in reaction and a situation protected from drying winds. No attempt should be made to set these acid-soil plants in a place that is underlaid with limestone, as it will be almost impossible to keep the soil acid enough for thrifty growth. Likewise, a location near the base of a house may not be successful because of the lime given off by the cement or mortar in the wall foundation. Some foundation plantings of these plants, however, have been thrifty. Soil that is slightly alkaline in reaction may be changed to acid by mixing with it powdered sulfur in the following amounts:

<i>Acidity at start</i>	<i>Sulfur to 100 square feet</i>
Medium acid (pH 5.5 to 6.0)	2 pounds
Slightly acid (pH 6.0 to 7.0)	4 pounds
Slightly alkaline (pH 7.0 to 7.5)	7 pounds
Strongly alkaline (pH 7.5 to 8.0)	Unsuitable for use

A pH value of 4.0 to 5.0 is suitable for most acid-soil plants. pH 7.0 is the neutral point, so pH 5.0 is two points on the acid side. This application can be repeated year after year if a test of the soil indicates that a more acid soil is required for the best growth of the plants.

Another method is to keep a permanent mulch underneath the plants. This mulch may be composed of acid peat moss, oak leaves, pine needles, tan bark, or well-decayed sawdust. The mulch is applied in the fall, left through the winter, *lightly* forked into the soil in the spring, and a new mulch is put on immediately.

A bed made to receive a planting of acid-soil plants may be composed of acid woods dirt that contains a large amount of organic matter. If this is not available, a satisfactory bed can be prepared with equal parts of acid garden loam, acid sand, and acid peat moss. These materials are mixed together before any planting is done.

PLANTING

Setting the plant

Bare-rooted plants

PLANTS that are delivered, or those that have been dug with bare roots, such as deciduous shrubs and small trees, should be planted at once by digging a hole large enough to allow the roots to be spread out completely.

A plant should be set at the same level that it was growing in its previous location. In heavy clay, the plant may be set a little high; in sandy soil or garden loam, it may be a little deeper. Good soil, free from sod, stones, and large lumps, should be packed firmly around the roots. This may be done with a pick or shovel handle or any similar tamping tool. If any sub-soil, such as heavy clay, is obtained in the process of digging the hole, this should be spread on top, not placed around the roots. The soil should not be mounded around the base of the plant, but should have a concave surface to drain the water toward the roots rather than off to the side.

After a medium- or large-sized tree is planted, it is securely fastened with guy wires to keep it from swaying in the wind, which would loosen the roots and cause the tree to lean. Rubber hose or wood slats are used to secure the wires to the tree. These should protect the tree from being girdled (figure 2, *E* and *F*).

Plants with ball of earth

Plants that are dug and delivered with a ball of earth on the roots and wrapped in burlap, such as medium-sized trees and evergreen shrubs, should be planted at once by digging a hole large enough to have a 6- to 12-inch clearance all around the ball of earth. The hole for the plant should be from 1 to 1½ inches deeper than the height of the ball of earth (figure 3). For best results the soil for the back fill should be mixed with wet peat moss (page 6). From 2 to 3 inches of this soil may be shoveled into the bottom of the hole before the plant, with the burlap still around the ball of earth, is set in the hole, and then 2 to 3 inches of fertile



FIGURE 3. METHOD OF PLANTING AN EVERGREEN

soil should be packed around the sides. The burlap should be cut loose, and tamped on this shallow layer of earth. Care must be taken not to break the ball. The hole should be filled half full of good soil, and the plant watered thoroughly. After the water has soaked in, the hole is filled with just enough firmed soil to leave a saucer-shaped surface around the base of the plant.

Watering

After planting, a thorough watering is necessary. The ground should not be allowed to dry out, at least during the first growing season. If the natural rainfall is not enough to keep the ground moist, artificial watering should be substituted. With most plants, overwatering is as injurious as underwatering, particularly in a heavy clay soil. Many plants will not tolerate an excess of water. A thorough watering at the time the plant is set helps to settle the soil firmly around the roots and temporarily provides ample moisture for absorption by the roots. A moist soil will also facilitate root penetration.

Mulching

After planting, a mulch of peat moss, well-rotted manure, straw, or leaves should be spread over the bed to a depth of from 2 to 3 inches. If the planting is done in the fall, the manure or other material should be left on the surface of the bed. This mulch prevents the frost from going to the depth that it ordinarily would and decreases the amount of destructive alternate thawing and freezing in the spring and fall. In the spring, this protecting mulch may be worked into the soil with a spading fork, but care must be taken not to spade deep enough to injure the roots. In spring planting, the mulch may be applied as it was for fall planting and left on the surface of the ground for a month or two before it is worked into the soil. Manure is objectionable because of its odor and because of the weed seeds it contains.

Pruning newly set plants

Shrubs

As soon as a shrub is set, the top of it should be cut back from one-third to one-half its foliage surface, particularly with those that are transplanted with bare roots (figure 4). Those transplanted with a large ball of earth may not need to be top-pruned at all. In cutting, one should be sure to keep the shrubs in their natural form of growth. Old and interfering branches can be cut off at the ground or at a point flush with the branch from which it is growing. Lateral branches should be cut off just above a joint.

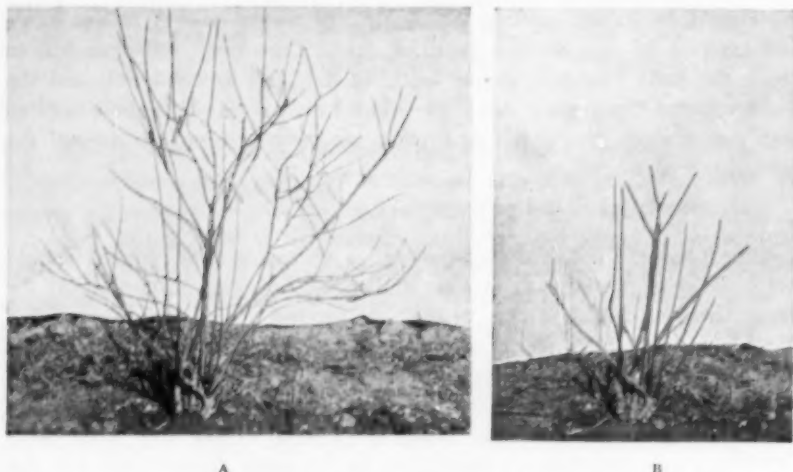


FIGURE 4. A NEWLY SET HYDRANGEA BEFORE PRUNING (A) AND AFTER PRUNING (B)

Vines

Newly set vines are trimmed in the same proportion as shrubs. Likewise, the cut is made just above a joint and in the head of the plant.

Deciduous trees

Deciduous trees are trimmed by merely thinning out the head of the tree. The main leader is not cut off but the lateral branch cuts are distributed throughout the head (figure 2, *F*). Crowding branch structures are eliminated. Other faulty structures are corrected by cutting out interfering branches and eliminating narrow crotches if this is possible without ruining the shape of the tree. Narrow crotches are not so strong as are wide ones. All cuts should be made directly above a joint, or, if a branch is completely removed, it should be cut off flush with the main trunk of the tree. Broken branches should be cut back to the first joint below the break. Now is the time to start forming a strong structural framework in the tree and to shape the tree in its natural form.

Evergreens

Evergreens that have been recently planted are seldom pruned, if ever, except to cut off broken or dead branches. This applies particularly to cutting the leader branches of pines, spruces, and the like which will disfigure the tree. Junipers, aborvitae, yew, and many others may be trimmed by cutting off the ends of the lateral branches. This trimming will force a dense growth.

MAINTENANCE

Cultivation

Shrub borders

SHRUB borders need only to be cultivated to eliminate weeds. As the plants mature in size they will become so dense that weeds will not grow beneath them.

Specimen plants

Specimen plants, such as trees or large shrubs, usually are grown with the grass extending up to the base of the plant. Some persons prefer to have a bare circle of ground at the base of the plant; the bare area needs only to be kept free of weeds.

Mulches

Much may be said about the use of a permanent mulch; that is, having a mulch on the shrubbery bed the year around. Summer mulch discourages the growth of weeds and helps to retain the moisture. On the other hand, a summer mulch encourages a growth of fibrous or feeding roots near the surface of the soil. This is not a desirable condition because these surface roots dry out during warm, dry periods of summer. However, most plants have enough deep roots to supply the plant with ample water and nutrients during these dry periods. Deeper rooting will be encouraged by continued cultivation. This practice also keeps weeds in check.

Newly set, hardy plants should be protected with a mulch, particularly during the first winter, and tender plants should be protected with a mulch every winter.

Several materials have been experimentally tested for mulching purposes and those that proved to be best are peat moss, straw, strawy manure, leaves, excelsior, and sawdust.

Watering

After the trees, shrubs, and vines have become established, they will not need to be watered artificially except in abnormally dry summer weather. During a dry season, watering with a hose may be resorted to if the plants show a definite need for water as indicated by wilting leaves. The plants should not be watered lightly each day but the ground underneath the plants should be given a thorough soaking once a week. The sprinkler may be left in the same place for an hour or two. This gives the water an opportunity to soak into the ground for some depth rather than just to remain on the surface where it will be taken up by the sun.

Fertilizers

On farm properties, the barnyard manure that usually is available may be used to fertilize ornamental plants as well as food crops and pastures. Most manures contain weed seeds. The resulting growth sometimes becomes difficult to control. Flower beds may be satisfactorily fertilized with liquid manure applied with a sprinkling can. Liquid manure may be made in a water-tight barrel. About 12 inches of manure is placed in the barrel. The barrel is then filled with water and allowed to stand for a day or more.

Inorganic commercial fertilizers are the most common types used today. They are made in various mixtures. A 5-10-15 fertilizer contains 5 per cent of nitrogen, 10 per cent of phosphorus, and 5 per cent of potash. A 10-20-10 fertilizer contains the same proportion of each element but is twice as strong as a 5-10-5 and would therefore be used at half the rate.

The extent to which fertilizers are applied for established plants during later years depends upon the fertility of the soil in which they are growing. If malnutrition is evident, as indicated by short and weak current season's growth not caused by lack of moisture, fungus, or insect attack, the soil may be improved by adding fertilizer. If plants are making good growth and have good foliage color, the soil in which they are growing probably is fertile enough, and more fertilizers need not be added.

Shrubs

Application of fertilizers, whether it be to an individual plant or a shrubbery bed, may be made in the spring about the time the buds are beginning to break. A late-fall application is satisfactory if it is made after all growth has stopped for that season. Early fall fertilization sometimes forces new tender growth that may not harden before winter sets in and that may winter-kill. If additional fertilizer is required, it may be applied in mid-summer and should be followed by a thorough watering.

Trees

Trees need to be fertilized only when they are not making good annual growth. If growth is not normal, it is advisable to fertilize annually to keep the trees in a healthy growing condition.

A tree that is weak from malnutrition is more subject to attack by diseases and insects than is a healthy tree. Even though a strongly growing tree is exposed to attack by its enemies, the damage done will be overcome more easily and rapidly if the tree is well nourished. Several methods are used to fertilize trees, and experiments are now going on to test these and the type of fertilizer that is most effective. The fertilizer may be broadcast either in the dry or liquid form, by using the crowbar method or by the aero-fertilizer method. The aero-fertilizer method is

used by professional tree surgeons and requires special equipment. The fertilizer is dispersed through the ground with air or water pressure. Either the broadcasting method or the crowbar method may be used by anyone, but the crowbar is probably the most effective. This is done by driving holes in the ground from 12 to 15 inches deep with an iron bar and pouring a small amount of fertilizer, about $\frac{3}{8}$ of a cup, in each hole. Each hole is then filled with water. The holes should be approximately 3 feet apart and should include all of the area under the tree within a diameter of from 10 to 20 feet greater than the spread of the branches. The amount of fertilizer to use depends upon the size of the tree; 1 pound of fertilizer for each inch of trunk diameter for small trees up to 3 inches in diameter, and 3 pounds of fertilizer to the inch for trees more than 10 inches in diameter. If the tree is already growing well, a mixed fertilizer of 12-8-6 analysis may be used. The fertilizer may be distributed evenly in the area mentioned.

Experiments indicate that many of the feeding roots of American elm growing in a heavy clay soil extend from 4 to 20 inches deep to a distance approximately equal to the height of the tree. Those growing in a sandy soil probably are deeper rooting. If this rooting character is true for other shade trees, a more effective fertilization would be obtained by using the fertilizer over a greater diameter than the spread of the branches.

Acid-soil plants

The acid-soil plants, such as rhododendron, laurel, and leucothoë, may be fertilized with cottonseed meal (about 7-5-2 analysis). This is a slowly available organic fertilizer and is acid in reaction. It may be applied at the rate of 4 pounds to 100 square feet of bed surface when the ground is bare, after the old mulch is removed and before the new mulch is applied.

Pruning

Shrubs

The principal value of a plant from an ornamental standpoint must be taken into consideration when the pruning is done. Some plants are best grown for their flowers, others for their fruit, and still others for their stem coloration. Shrubs may be divided into several pruning groups according to their effective landscape value. These groups are: (1) plants with desirable flowers, (2) plants with desirable fruit, (3) plants with showy stem coloration, (4) general form of the plant, and (5) disease- and insect-affected parts.

Desirable flowers

Shrubs that have attractive flowers must be pruned with consideration to the time of year when they bloom. Most early-flowering plants bloom

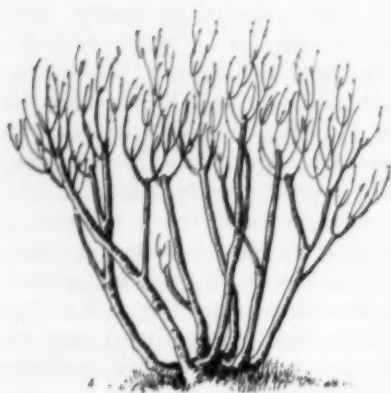


FIGURE 5. HONEYSUCKLE INCORRECTLY CUT BACK AT THE TOP

Note the "witch's broom" effect. The beauty of this plant has been destroyed for a period of several years

from buds formed on last summer's twigs. Examples of this group are forsythia, deutzia, Vanhoutte's spirea, lilacs, and the like. Such plants should be pruned from one to two weeks after bloom. This is called *summer pruning*, although the actual time of performing the work may be in May or June, soon after the plants are through flowering. If this pruning is delayed until winter, and last summer's twigs are then removed, there will be considerable loss of bloom until the plant has had a year to grow new twigs. Plants of this group, as well as most others, produce their flowers on the young wood.

Late-flowering plants produce new twigs in the spring, and on this new wood the flowers appear late in the season. Examples of this group are peegee hydrangea (*Hydrangea paniculata grandiflora*), shrub althea, or rose of sharon (*Hibiscus syriacus*), Anthony Waterer spirea (*Spiraea bumalda* Anthony Waterer), and rugosa rose (*Rosa rugosa*). Such plants may be pruned during the late fall after stem growth has ceased, or at any time after that before growth starts in the spring, without danger of removing the flower buds.

The flowering period of a few shrubs can be prolonged or a second crop of flowers may be produced by trimming out the wood that has already borne the first blooms. Shrubs in this group are Anthony Waterer spirea, buddleia, *Rosa rugosa*, and weigela.

Desirable fruit

The plants that are particularly desirable in the landscape scheme because of their fruit, such as viburnums (in variety), winterberry (*Ilex verticillata*), Japanese barberry (*Berberis Thunbergii*), hawthorns (in variety), privet (in variety), may also be valuable because of their flowers. The flowers are produced from buds that have been formed on the preceding year's twig growth and the fruit succeeds the flower just as is true with the edible fruits. If all of the flowering branches are cut off soon after they bloom, the plant will not produce fruit as it normally would during midsummer or late fall. With this group of shrubs, light pruning should be practiced soon after the flowers disappear. This pruning should be done in a similar

way to that described on page 18; that is, by removing a few of the oldest stems at the ground and by thinning the top branches where the stems are too crowded. The method is the same but the amount of pruning varies. The fruiting shrubs should not be pruned so heavily as the flowering types. The shrubs merely should be opened up to allow the light to reach the center of the plant. Usually this thinning shows much of the fruit that would be concealed otherwise by the dense foliage.

Showy stem coloration

Shrubs that have showy colored stems produce their most brilliant color on new wood. For this reason heavy pruning should be resorted to every year. The method of pruning is the same as for other plants; but more pruning is done. Plants that come in this group are some of the dogwoods (*Cornus alba*, *C. Amomum*, *C. stolonifera* and var. *flaviramea*), kerria (*Kerria japonica*), forsythia (*Forsythia intermedia spectabilis*), and some of the low-growing shrub roses.

Form of plant

Pruning done to maintain or modify the shape of a plant varies considerably, depending upon the desired effect. Most of this pruning is done to maintain the natural shape of the plant. The general pruning practices are followed, but special consideration must be given to each individual when a modification of the normal shape is desired. If the normal shape of a plant is pyramidal and this form must be accentuated, the lateral branches should be trimmed back to an inside bud or branch (figure 6). If, on the other hand, a broader plant is desired, the lateral branches may be trimmed back to an outside bud. Cutting to an outside bud accents the horizontal or stratified growing habit of a shrub, and cutting to an inside bud minimizes the effect.

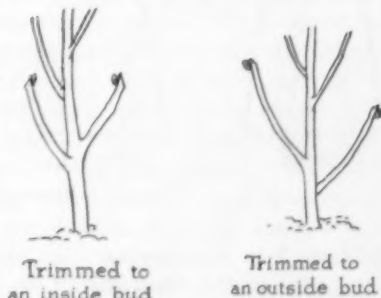


FIGURE 6. A SHRUB TRIMMED TO AN INSIDE BUD AND AN OUTSIDE BUD

Other instances of modified form in plants are espalier fruit trees and some shrubs, such as forsythia (*Forsythia intermedia spectabilis*), used as vines. The espalier fruit trees are trimmed to produce a shape similar to a five- or seven-branched candlestick, and the branches are tied to a trellis. This may form an enclosure to a flower garden, a screen for a service area, or a vine at the side of a building. A shrub trimmed as a vine may be used near the house or on a porch where most vines would

be too heavy, too dense, or too large. This practice requires some special care in pruning. All the stems, except two or three at the base, are cut off. These two or three stems are supported on a trellis or wire, as are other vines.

Hedge plants require special trimming. A modified shape is obtained by the continual trimming of the lateral branches, which forces a dense growth of foliage and twigs. Late-summer pruning of hedges is unsafe, as this practice induces a new growth of wood that rarely becomes hardened enough to withstand severe winter weather.

Trimmed hedges should be used sparingly and judiciously. They are likely to be entirely out of keeping as a border for walks and boundaries of the front lawn. This arrangement sometimes appears neat and tidy if it is well kept, but it requires considerable work in trimming. Formal gardens may appropriately have clipped hedges, or such hedges may be properly used as a background for small architectural features in a flower garden. A hedge should be trimmed in June. This removes most of the current season's growth, and, unless the plants are very thrifty, they need no trimming for the rest of the summer.¹ The hedge should be narrower at the top than at the bottom (figure 7). A hedge 2 feet in height should

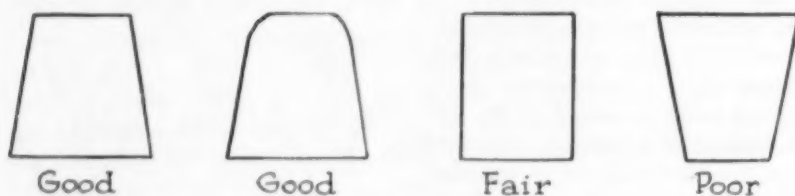


FIGURE 7. SHAPES OF TRIMMED HEDGES

be from 3 to 4 inches narrower at the top than at the bottom. Shaping the hedge in this form should be started the first season after planting, and should be maintained year after year until the hedge has acquired the desired height. This form enables the sun to strike the sides from the top to the bottom and helps to maintain a dense growth close to the ground.

Method of pruning

Except for diseased plants and those affected by insects, the principal after-care of most hardy deciduous shrubs consists of pruning and fertilization. The condition and shape of the shrubs and their location on the property will help to determine the amount and character of pruning

¹ Hedge plants that grow rapidly may need to be trimmed three or more times a year (early May, late June, and late July) if they are to be kept neat.

to be done each year. The shrubs, either individually or as a group, should be kept in a normal shape and in a healthy condition. By removing two or three of the older stalks at the base of the plant each year and cutting out diseased and weak branches, gradual renewal may

be accomplished and new growth encouraged from the base. Pruning garden roses, fruit trees, and edible fruiting vines differs from this procedure, because, with these, pruning must be done each year for the best results in flower and fruit.

Shrubs that have been neglected for several years need special care in pruning. Gradual renewal of new branches should be the rule. This is accomplished by cutting a few of the oldest branches off as near to the ground as possible, which will probably force a growth of some new branches from the base of the shrub. The following year a few more of the oldest branches may be cut off (figure 9). This practice may be continued until all the oldest branches have been removed and new ones have taken their place. Sometimes, if the cutting of old branches is overdone at any one time, long straight shoots are produced. These should be cut off at the point flush with the mother branch, leaving only the normal new growth. This pruning should be done at a time of year agreeable to the most important character of the individual plant. Some shrubs may be very dense on one side of the plant and not in other parts of the head. Then it may be necessary to thin a few of these dense branches. Each cut in the head of the plant should be made flush with the branch from which the one to be removed arises or at a place from $\frac{1}{8}$ to $\frac{1}{4}$ inch above a bud or the point of branching (figures 5, 6, 8, 9). Shrubs in the group where this type of trimming would be used include the following:

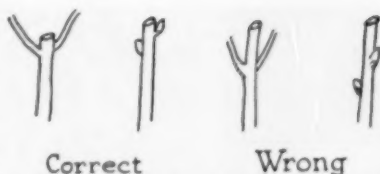


FIGURE 8. CORRECT AND WRONG METHODS OF PRUNING

Japanese barberry (*Berberis Thunbergii*)

European barberry (*Berberis vulgaris*)

Sweetshrub (*Calycanthus floridus*)

Tatarian dogwood (*Cornus alba*)

Gray dogwood (*Cornus racemosa*)

Red-osier dogwood (*Cornus stolonifera*)

Japanese quince (*Chaenomeles lagenaria*)

Slender deutzia (*Deutzia gracilis*)

Pride of Rochester deutzia (*Deutzia scabra plena*, Pride of Rochester)



A



B

FIGURE 9. SPIREA BEFORE PRUNING (A) AND AFTER PRUNING (B)

Winged euonymus (*Euonymus alatus*)
Weeping forsythia (*Forsythia suspensa*)
Greenstem forsythia (*Forsythia viridissima*)
Hills-of-snow hydrangea (*Hydrangea arborescens grandiflora*)
Kerria (*Kerria japonica*)
Beautybush (*Kolkwitzia amabilis*)
Regel privet (*Ligustrum obtusifolium Regelianum*)
Winter honeysuckle (*Lonicera fragrantissima*)
Morrow honeysuckle (*Lonicera Morrowii*)
Tatarian honeysuckle (*Lonicera tatarica*)
Sweet mockorange (*Philadelphus coronarius*)
Lemoine mockorange (*Philadelphus Lemoinei*)
Common ninebark (*Physocarpus opulifolius*)
Jetbead (*Rhodotypos tetrapetala*)
Meadow rose (*Rosa blanda*)
Father Hugo's rose (*Rosa Hugonis*)
Virginia rose (*Rosa virginiana*)
Japanese rose (*Rosa multiflora*)
Rugosa rose (*Rosa rugosa*)
Prairie rose (*Rosa setigera*)
Flowering raspberry (*Rubus odoratus*)
American elder (*Sambucus canadensis*)
Scarlet elder (*Sambucus pubens*)
Billiard spirea (*Spiraea Billiardii*)
Anthony Waterer spirea (*Spiraea Bumalda* Anthony Waterer)
Thunberg spirea (*Spiraea Thunbergii*)
Vanhoutte spirea (*Spiraea Vanhouttei*)
Garden snowberry (*Symphoricarpos albus laevigatus*)
Coral-berry (*Symphoricarpos orbiculatus*)
Withe-rod (*Viburnum cassinoides*)
Arrowwood (*Viburnum dentatum*)
European cranberrybush (*Viburnum Opulus*)
Doublefile viburnum (*Viburnum plicatum tomentosum*)
Japanese snowball (*Viburnum plicatum*)
Weigela (*Weigela* varieties)

Many of the plants listed, if they have become ill-shaped, may be cut off at the ground in the fall or early spring and allowed to grow up from the base.

Best results in flowers will be obtained in lilacs and azaleas if the flower heads are cut off immediately after the flowers have faded.

Another group of shrubs may be cut off at the ground each fall. The following plants may be treated in this way. They will make a complete growth and flower in one season.

Buddleia (*Buddleja Davidii*)
Hills-of-snow hydrangea (*Hydrangea aborescens grandiflora*)
American elder (*Sambucus canadensis*)
Anthony Waterer spirea (*Spiraea Bumalda* Anthony Waterer)

Those shrubs that normally grow in tree form or semi-tree form should not be cut at the base of the plant. An exception to this might be the peegee hydrangea, which may be cut at the base and forced to grow in shrub form. Others that grow in this habit should be trimmed in the head of the plant. The interfering branches and those that have become diseased or broken should be removed. Each cut should be made just above a joint or flush with the branch on which it is growing. This group includes the following plants:

Common witch hazel (*Hamamelis virginiana*)
Shrub-althea (*Hibiscus syriacus*)
Peegee hydrangea (*Hydrangea paniculata grandiflora*)

A few shrubs will need little or no trimming, at least until they have become very old and rangy, except to cut out dead wood, diseased or broken branches. They are:

Winter honeysuckle (*Lonicera fragrantissima*)
Morrow honeysuckle (*Lonicera Morrowii*)
Tatarian honeysuckle (*Lonicera tatarica*)
Witthe-rod (*Viburnum cassinoides*)
Arrowwood (*Viburnum dentatum*)
European cranberrybush (*Viburnum Opulus*)
Doublefile viburnum (*Viburnum plicatum tomentosum*)
Japanese snowball (*Viburnum plicatum*)

Vines

Some of the vines will not need to be pruned after they have become established except to remove dead wood. This group includes English ivy (*Hedera Helix*), Engelmann's ivy (*Parthenocissus quinquefolia Engelmannii*), Boston ivy (*Parthenocissus tricuspidata*), climbing hydrangea (*Hydrangea petiolaris*), and wintercreeper (*Euonymus Fortunei vegeta*). In flowering and fruiting vines, such as clematis, Hall's honeysuckle (*Lonicera japonica Halliana*), bittersweet (*Celastrus scandens*), and others, the dead wood should be cut out as frequently as it appears. Usually the oldest wood should be cut off at the base, and a few of the younger stalks

may be cut if they are too crowded. This cutting will have to be done from one to two weeks after the vines have flowered or fruited, depending upon the individual plant. If the vine is growing with only one or two branches from the base, it would not be advisable to cut these off and leave no foliage on the plant; the pruning should be done higher on the plant to force more branches from the base.

Summer pruning of wisteria may help to produce flowers. This is done by trimming out the young shoots as they appear during the summer.

Deciduous trees

Deciduous trees are trimmed in much the same way as described previously on page 6. In addition to this, dead branches should be removed. Unnecessary wood, interfering branches, and broken branches should be removed as illustrated in figure 10. A stub end should never be left on a tree. Care should be taken to maintain the natural shape of the tree and the ultimate strength of its structure. A narrow crotch is not so strong as a wide one, so an effort should be made to eliminate the narrow angles that may exist between two branches. Some small twigs may be trimmed off where they are too close together. General tree pruning is done during the late winter or very early spring. During the early spring, cambium growth is most active and the wound will heal much more quickly than if it is done at other times of the year. However, such trimming may be done at almost any time of year without damage to the tree if proper precaution is taken to paint all wounds $\frac{3}{4}$ inch or more in diameter. The best paint is emulsified asphalt. Trees that are of value because of their flowers, such as hawthorns and flowering dogwood, should be pruned after the bloom is past if full benefit of the flowers is to be obtained.

Extensive tree surgery by the amateur is not recommended. It is possible for the home owner to gouge out rotted and diseased wood in a tree and to paint the exposed surface with fungicide, such as bordeaux paste or copper sulfate (1 ounce to 1 gallon), and to cover this surface with emulsified asphalt or a dark-colored linseed oil paint. The cambium layer, those cells between the bark and the solid wood, should be covered with orange shellac before the other materials are applied. Orange shellac will not injure this growing tissue to any noticeable extent. Some bracing of weak crotches may be done if care is taken not to girdle the branches that are to be braced. Screw hooks may be placed in the two branches



FIGURE 10. WRONG AND CORRECT WAY TO CUT OFF A LARGE BRANCH

to be strengthened and a cable secured between them. This usually saves a weak crotch from splitting.

Narrow-leaved evergreens

Necessary pruning of *narrow-leaved evergreens* can be done at any time of year except during the spring growing season or the hot, dry periods of summer. The best time is early in the spring before growth has started, but this work may be done in October when growth has ceased. Evergreen trees, such as pines and spruces, should not be trimmed at all except to cut out the dead or diseased wood. A dense growth can be forced on these trees by cutting off the ends of the lateral branches. The same is true with evergreens such as arborvitae, junipers, yew, and retinospora. Shrub form narrow-leaved evergreens, such as Pfitzer juniper and shrub Japanese yew, usually grow to a considerable width and, over a period of years, absorb a larger space than was intended. They can be kept informal in character and their width decreased by cutting off their side branches irregularly in a staggered fashion. More length should be cut off some branches than others. The side branches, however, may be cut off evenly to produce a formal shaped plant if desired.

Hedges

A few narrow-leaved evergreens can be used as hedges or clipped into various shapes. White cedar or American arborvitae (*Thuja occidentalis*), red cedar (*Juniperus virginiana*), and hemlock (*Tsuga canadensis*) are the most common tree varieties that stand clipping. Yew (*Taxus cuspidata*), box (*Buxus sempervirens*), and Pfitzer's juniper (*Juniperus chinensis pfitzeriana*) are the most common low-growing evergreens for trimmed hedges. The red cedar is inclined to thin out when the trees are planted too close together or if they are planted in the shade. This tree is the host to apple-rust organisms so should not be used near orchards. Spruce trees and Colorado fir may be used for trimmed hedges, but they are not so desirable because of their coarse texture.

WINDBREAKS

THE KIND of tree to use for windbreak plantings depends upon the situation and the desired height of the planting. Windbreak plantings for farm-home grounds should be composed of trees that are dense in their character of growth. Also, they should be of varieties that tend to keep their lower branches when crowded by other trees. Those that best meet these requirements are Douglas fir, hemlock, red pine, western yellow pine, white pine, Austrian pine, Black hills spruce, white spruce, Norway spruce, and white cedar. They should be planted on the windward side of the barnyard and house and at least 100 feet from the nearest buildings.

A satisfactory windbreak can be made with three or four rows of trees, planting the trees 8 feet apart in the row and the rows from 8 to 10 feet apart. This is true for all the plants listed except white cedar, which should be planted 3 feet apart. If there is room for it, a temporary planting of quick-growing deciduous trees may be made outside the evergreens. This may be composed of choke cherry or willows which should be taken out as soon as the evergreen trees become large enough to be effective. There is no question about the protection afforded by a windbreak of this kind in a windswept location.

PLANT LISTS

IN PLANNING new plantings it is of utmost importance to use the plants with regard to their mature size. A plant that does not meet the size requirement of a certain location is the wrong plant for that place. The following lists are not complete. They are divided into size groups, but it should be kept in mind that soil and moisture conditions will influence somewhat the mature size of a plant. Good soil produces a larger plant than does poor soil. Also, the same variety grows larger in a mild climate than a colder one. Annual pruning, if necessary, keeps the plants in the size group listed.

The following plants are classified according to the height they will attain under average New York State conditions.

Scientific names of plants follow L. H. Bailey's *Manual of Cultivated Plants* (1949).

Key:

- *Will tolerate shade
- †Requires an acid soil
- ‡Not quite hardy in exposed locations
- §Prefers moist locations
- The name in parentheses is the old name

Vines for trellises

Deciduous

- Bower actinidia, *Actinidia arguta*
- Fiveleaf akebia, *Akebia quinata*
- Dutchmans-pipe, *Aristolochia durior* (siph)
- American bittersweet, *Celastrus scandens*
- Trumpet creeper, *Campsis* (*Bignonia*) *radicans*
- ‡Clematis in variety
- Trumpet honeysuckle, *Lonicera sempervirens*
- ‡China fleece-vine, *Polygonum Aubertii*
- Japanese wisteria, *Wisteria floribunda*
- ‡Climbing and rambler roses (Must be attached to the support)

Semi-evergreen

- Hall honeysuckle, *Lonicera japonica* Halliana

Vines for masonry walls

Deciduous

- * †Climbing hydrangea, *Hydrangea petiolaris*
- * Virginia creeper, *Parthenocissus (Ampelopsis) quinquefolia*
- * †Japanese creeper, *Parthenocissus (Ampelopsis) tricuspidata*

Evergreen

- Bigleaf wintercreeper, *Euonymus Fortunei vegetus (radicans vegetus)*
- * †English ivy, *Hedera Helix* (Does best on north side of building)

Ground covers

Deciduous

Memorial rose, *Rosa Wichuraiana*

Evergreen

- * Sharpleaf wintercreeper, *Euonymus Fortunei*
- * Baby wintercreeper, *Euonymus Fortunei minimus*
- * †Wintergreen, *Gaultheria procumbens*
- Sargent juniper, *Juniperus chinensis Sargentii*
- Waukegan juniper, *Juniper horizontalis Douglasii*
- * †Partridgeberry, *Mitchella repens*
- * Japanese pachysandra, *Pachysandra terminalis*
- * Common periwinkle, *Vinca minor*

Shrubs 1½ to 3 feet high

Deciduous

- Jersey tea, *Ceanothus americanus*
- Rockspray, *Cotoneaster horizontalis*
- †Slender deutzia, *Deutzia gracilis*
- Golden St. Johnswort, *Hypericum frondosum*
- Tibetan honeysuckle, *Lonicera thibetica*
- Flowering almond, *Prunus glandulosa sinensis*
- Anthony Waterer Spirea, *Spiraea Bumalda Anthony Waterer*
- * Coralberry, *Symphoricarpos orbiculatus (vulgaris)*
- Dwarf cranberrybush, *Viburnum Opulus nanum*

Evergreens

- Rose Daphne, *Daphne Cneorum*
- Andorra juniper, *Juniperus horizontalis plumosa*
- * †Drooping leucothoe, *Leucothoe Catesbaei*
- * †Mountain andromeda, *Pieris floribunda*
- * †Daphne rhododendron, *Rhododendron arbutifolium*
- * †Myrtle rhododendron, *Rhododendron myrtifolium*
- * Canada yew, *Taxus canadensis*
- * Dwarf Japanese yew, *Taxus cuspidata nana*
- * Little gem arborvitae, *Thuja occidentalis pumila*

Shrubs 4 to 5 feet high

Deciduous

- *§ Black chokeberry, *Aronia melanocarpa*
- * Japanese barberry, *Berberis Thunbergii*
Butterflybush, *Buddleja Davidii*
- ‡Beautyberry, *Callicarpa dichotoma* (purpurea)
- ‡Common sweetshrub, *Calycanthus floridus*
Russian pea-tree, *Caragana frutex grandiflora*
Spreading cotoneaster, *Cotoneaster divaricata*
- * Hybrid Japanese quince, *Chaenomeles superba*
- ‡February daphne, *Daphne Mezereum*
- * Drooping goldenbell, *Forsythia suspensa*
- * Snowhill hydrangea, *Hydrangea arborescens grandiflora*
- ‡Kerria, *Kerria japonica*
- * Regel privet, *Ligustrum obtusifolium* (ibota) Regelianum
- * American fly honeysuckle, *Lonicera canadensis*
- ‡Bayberry, *Myrica pensylvanica* (carolinensis)
Lemoine mockorange, *Philadelphus Lemoinei*
Double-flowering plum, *Prunus triloba multiplex* (P. triloba plena)
- * †Pinxterbloom, *Rhododendron* (Azalea) nudiflorum
- * †Japanese azalea, *Rhododendron* (Azalea) japonicum
- * †Downy pinxterbloom, *Rhododendron* (Azalea) roseum
- * Fragrant sumac, *Rhus aromatica* (canadensis)
Rose Acacia, *Robinia hispida*
Virginia rose, *Rosa virginiana* (lucida)
Rugosa rose, *Rosa rugosa*
Garland spirea, *Spiraea arguta*
- ‡Billiard spirea, *Spiraea Billiardii*
- ‡Thunberg spirea, *Spiraea Thunbergii*
Ural-false spirea, *Sorbaria sorbifolia*
- * Cutleaf stephanandra, *Stephanandra incisa* (flexuosa)
- * Snowberry, *Symphoricarpos albus* (racemosus) laevigatus
- * Mapleleaf viburnum, *Viburnum acerifolium*
- ‡Fragrant viburnum, *Viburnum Carlesii*
Weigela, *Weigela hybrida*

Evergreen

- Pfitzer juniper, *Juniperus chinensis Pfitzeriana*
- Savin juniper, *Juniperus Sabina*
- * †Mountain laurel, *Kalmia latifolia*
- * Shrub Japanese yew, *Taxus cuspidata*
Ware arborvitae, *Thuja occidentalis robusta* (Wareana)

Shrubs 6 to 8 feet high

Deciduous

- ‡Scarlet Japanese maple, *Acer palmatum*
- *§ Spice bush, (*Benzoin aestivale*) *Lindera Benzoin*
- *§ Summer sweet, *Clethra alnifolia*
- *§ Red-stem dogwood, *Cornus alba*
- * Gray dogwood, *Cornus racemosa*

- Winged euonymus, *Euonymus alatus*
- * Showy goldenbell, *Forsythia intermedia spectabilis*
- ‡ Shrub althea, *Hibiscus syriacus*
- § Winterberry, *Ilex verticillata*
- ‡ Beautybush, *Kolkwitzia amabilis*
- ‡ Winter honeysuckle, *Lonicera fragrantissima*
- * Morrow honeysuckle, *Lonicera Morrowii*
- Bayberry, *Myrica pensylvanica* (*M. carolinensis*)
- Jetbead, *Rhodotypos scandens* (*kerrioides*)
- * Flowering currant, *Ribes odoratum*
- Hugonis rose, *Rosa Hugonis*
- Harrisons yellow rose, *Rosa Harisonii* (*feotida harisoni*)
- § American elder, *Sambucus canadensis*
- § Scarlet elderberry, *Sambucus pubens*
- Bridalwreath, *Spiraea prunifolia plena*
- Vanhoutte spirea, *Spiraea Vanhouttei*
- Chinese lilac, *Syringa chinensis*
- * Withe rod, *Viburnum cassinoides*
- * Arrowwood, *Viburnum dentatum*
- Linden viburnum, *Viburnum dilatatum*
- Japanese snowball, *Viburnum plicatum* (*tomentosum*)

Evergreens

- * ‡ Rhododendrons in variety
- * Hatfield yew, *Taxus media* Hatfieldii

Large shrubs 8 to 15 feet high

Deciduous

- Siberian pea tree, *Caragana arborescens*
- * Wahoo, *Euonymus atropurpureus*
- * Amur privet, *Ligustrum amurense*
- Tatarian honeysuckle, *Lonicera tatarica*
- * Late honeysuckle, *Lonicera Maackii podocarpa*
- Sweet mockorange, *Philadelphus coronarius*
- Virginal mockorange, *Philadelphus virginialis*
- * Buckthorn, *Rhamnus cathartica*
- Common smoke tree, (*Rhus cotinus*) *Cotinus Coggia*
- Late lilac, *Syringa villosa*
- * Garden lilac, *Syringa vulgaris*
- French hybrid lilacs
- * Nannyberry, *Viburnum Lentago*

Evergreens

- Thread retinispora, *Chamaecyparis pisifera filifera*
- * Upright Japanese yew, *Taxus cuspidata capitata*
- * Hicks yew, *Taxus media Hicksii*
- * Pyramidal arborvitae, *Thuja occidentalis* "Douglasii pyramidalis"

Small trees 15 to 20 feet high

Deciduous

- Allegheny shadblow, *Amelanchier laevis*
- ‡Redbud, *Cercis canadensis*
- ‡White fringe tree, *Chionanthus virginica*
- Pagoda dogwood, *Cornus alternifolia*
- ‡Flowering dogwood, *Cornus florida*
- Cornelian cherry, *Cornus mas*
- Hawthorn (in variety)
- ‡Great silverbell, *Halesia carolina (tetrapetala)*
- Common witchhazel, *Hamamelis virginiana*

Evergreens

Chinese juniper, *Juniperus chinensis*
 Red cedar, *Juniperus virginiana*
 American arborvitae, *Thuja occidentalis*

Large trees 50 to 100 feet high

Deciduous

- Sugar maple, *Acer saccharum*
- Canoe birch, *Betula papyrifera*
- Shagbark hickory, *Carya (Hicora) ovata*
- American beech, *Fagus grandifolia (americana)*
- European beech, *Fagus sylvatica*
- White ash, *Fraxinus americana*
- Maidenhair tree, *Ginkgo biloba*
- European larch, *Larix decidua (europaea)*
- American larch, *Larix laricina*
- Tulip tree, *Liriodendron Tulipifera*
- White oak, *Quercus alba*
- Scarlet oak, *Quercus coccinea*
- Pin oak, *Quercus palustris*
- Red oak, *Quercus borealis maxima (rubra)*
- American linden, *Tilia americana*
- Little-leaf European linden, *Tilia cordata*
- American elm, *Ulmus americana*

Evergreen

- White fir, *Abies concolor*
- Veitch fir, *Abies Veitchii*
- Norway spruce, *Picea Abies (excelsa)*
- Blue Colorado spruce, *Picea pungens glauca*
- Red pine, *Pinus resinosa*
- White pine, *Pinus Strobus*
- Scotch pine, *Pinus sylvestris*
- Douglas spruce, *Pseudotsuga taxifolia (douglasii)*
- Canada hemlock, *Tsuga canadensis*
- Carolina hemlock, *Tsuga caroliniana*

GARDEN ROSES

GARDEN roses may well be included in the group of plants whose landscape value rests with its flowers. The floribunda roses and ever-blooming climbers are relatively new classes of plants in this group. Both of them produce a profusion of bloom and give good color for a long period during the summer.

Location

The roses should be planted in a sunny location, one that is protected, if possible, from cold winter winds, and one that is far enough from other strong plant growth to avoid competition with the roots. The soil should be a well-prepared garden loam that contains a large amount of organic matter. It should be a soil that will retain a considerable amount of moisture but still not be water soaked. Preparing the soil with peat moss or well-rotted manure is good practice. A slightly acid soil (pH 6.5) is best.

Planting

Only field-grown roses of No. 1 or No. 1½ grades should be purchased for planting because these will be acclimated and hardy enough to withstand the first cold winter. Either early-spring or late-fall planting is successful, but spring planting is preferable. This may be done as late as it is possible to work the ground satisfactorily. Roses should be planted carefully, as soon as they are received, in the prepared bed. With spring planting, the soil should be mounded 10 inches high around the base of the plant and left for two to three weeks before it is removed. With fall planting, the mound of soil should be left undisturbed until spring. Roses should be planted so that the point of budding is 1 inch below the surface of the soil. As soon as the roses are planted, the tops should be cut back to within 6 to 8 inches above the point of budding if they have not already been cut back by the nurseryman.

Winter protection

The practice of mounding the soil around the base of hybrid teas and hybrid perpetuals that have become established should be continued each fall. The plants are later mulched with 5 inches of straw without manure. Both the straw and the mound of soil are removed in the spring after the heavy frosts are past.

The same process is used to protect climbing and pillar roses and, in addition, the stems are removed from their support early in the fall and laid on the ground. They should be kept as flat on the surface of the ground as possible by the use of stakes to hold them down. The stems are not covered, but the grass is allowed to grow up between them, which



A



B

FIGURE 11. CLIMBING ROSE BUSHES PROTECTED FOR WINTER

A. The branches have been removed from the trellises and mounted with soil. The grass which has grown among the branches furnishes additional protection.

B. After the ground has frozen, a strawy mulch is placed over the mounded soil.

gives some protection (figure 11). A mound of soil and straw is used around the base of the plants as recommended for hybrid tea and perpetual roses.

Pruning²

It is necessary to prune roses properly to get the greatest number of blooms and the most vigorous plants. The ideas of rose experts have changed in the past few years, and the severe spring pruning formerly recommended is no longer considered best for the plants.

Bush or bedding rose varieties that belong to the hybrid tea, hybrid perpetual, polyantha, and floribunda classes should be pruned in the spring. The climbers and shrub types should be pruned immediately after flowering.

In the spring pruning, no more of the vigorous live wood is removed than is necessary. The more wood that is left on the plants, the more the blooms, the more vigorous the plants, and the better colored the flowers.

Bush or bedding types

The steps to follow in pruning the bush or bedding types are these:

1. Remove all weak stems that are smaller in diameter than a lead pencil.
2. Cut back the stems that have been injured during the winter to where they appear green and healthy.
3. Make the top cut on each stem about $\frac{1}{4}$ inch above a bud. Slant the cut slightly. Wherever possible, make the top cut so that the top bud points outward. This encourages a better shaped plant and permits air and sunshine to reach the center.
4. Stems that are very long after the previous steps have been completed may be cut back to the general height of the other canes for the sake of the appearance of the bed.

Climbing roses

Climbing roses are best pruned immediately after flowering in July. Little pruning is needed on the large-flowered and everblooming climbers.

Remove the dead flower clusters back to a point about 3 inches from where the flowering stem joins the main cane. When the number of canes arising from the base of the plant is too large, cut some of the older ones off at the ground level.

Vigorous ramblers such as Dorothy Perkins or American Pillar can be pruned more severely by removing to the soil surface several of the canes that have flowered. Spring pruning of climbers involves only the removal of injured wood.

² Prepared by R. C. Allen.